OSCAR
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REPORT

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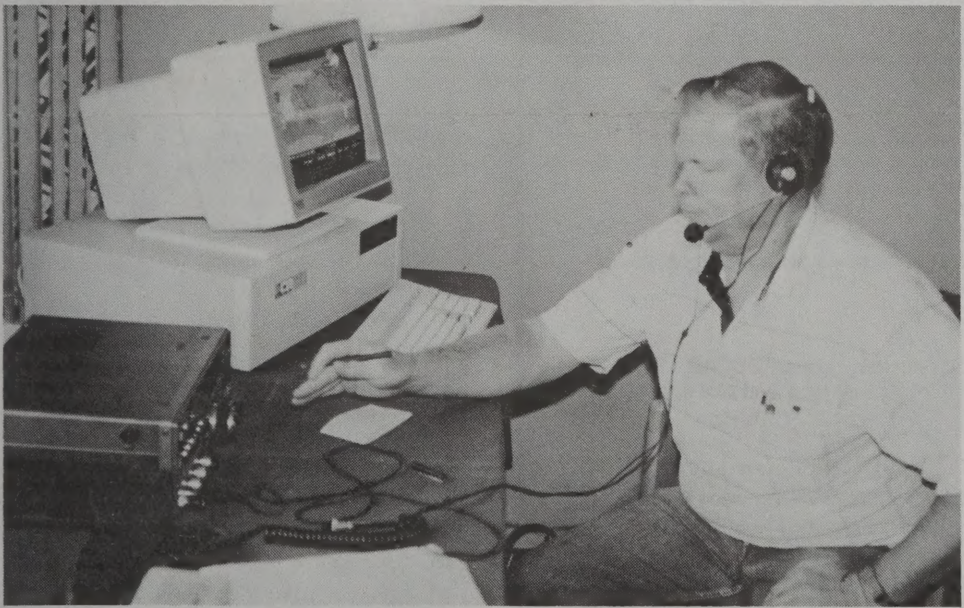
The Annual Space Symposium Los Angeles, California

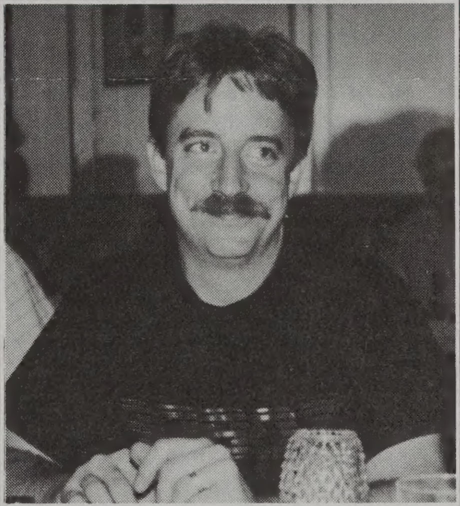
This issue of *OSCAR Satellite Report* will devote a major amount of space to the convention of Amateur Radio Space enthusiasts that met the weekend of November 7-10, 1991. If you didn't get there, you missed a real treat.

By Bob Myers, W1XT

The following is a compilation of notes from the convention, several photos, and the observations of only your author. With more than 200 key people in the Amateur Radio business attending, it was impossible to talk to everyone. The agenda was filled solid with presentations on almost every aspect of the satellite program, including weather imaging, and education programs for schools. We regret having missed a few presentations and not meeting with some folks directly, most notably Dick Campbell, N3FKV, the supplier of Keplerian elements to both OSCAR Satellite Report *and* Satellite Operator. *This convention is something like an HF contest: You can spend 48 hours on the bands and not QSO someone who has been on the same bands for the same 48 hours. Seems impossible, but it isn't!*



In room 205 of the Holiday Inn at LAX, Dennis, K6IVY, a member of the convention committee, kept the OSCAR station in full operation. Hundreds of QSO's were made from here, many by *OSCAR Satellite Report's* DX Editor, John Fail, KL7GRF. Station antennas will be shown in future issues. *(Photo by W1XT)*



Gene Davies, AA6NP, was committee chairman to host the Los Angeles Space Symposium and did an outstanding job of pulling it all together. There is no question that without the efforts of Gene and his crew, this event would not have been the success that it was. Gene has promised to give *OSCAR Satellite Report* a complete wrapup of the event along with banquet prize winners and a list of everyone who helped make this "happening" the overwhelming success it was. But we'll give Gene a week or two off to gather his thoughts (senses?)! (Photo by W1XT)

We shot over 300 photographs. Lots of these will be in the next few issues of *OSCAR Satellite Report* and of course, a large number will be published in *Satellite Operator*. Shown in this issue are some of the early-on prints which we had processed at the local One-Hour Photo Palace, across from the Holiday Inn in Los Angeles. As we prepare this issue, we have hundreds of other black and white shots to develop.

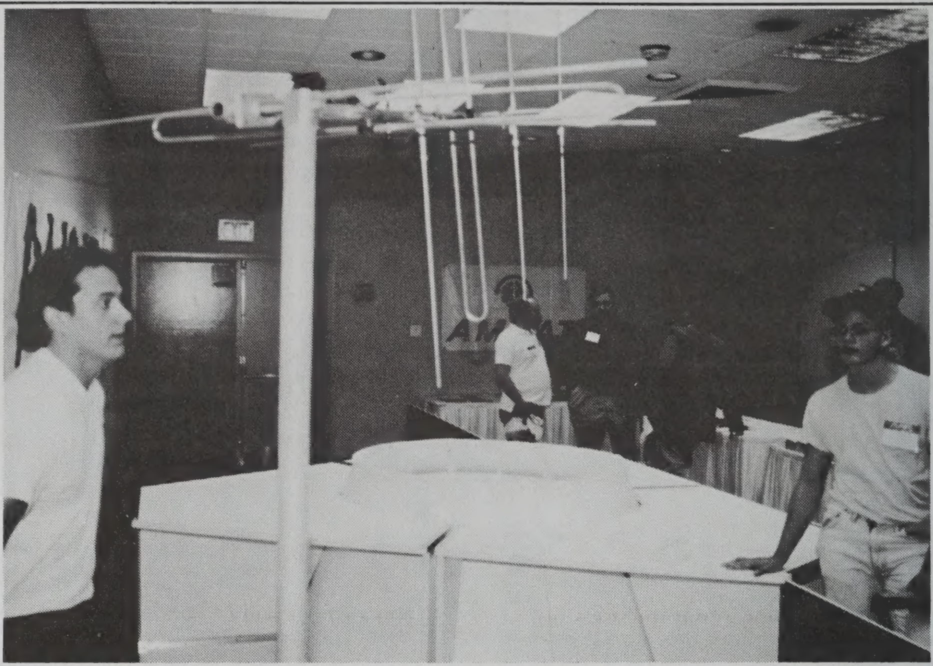
DXing the OSCARs

The first event on the weekend schedule came Thursday evening, with a caravan trip (about 10 cars) through the back streets of Los Angeles from the Holiday Inn at LAX to the home of John Fail, KL7GRF, in Long Beach. I'll not describe the experience of being in the back seat of car number 8, driven by *OSCAR Satellite Report's* Editor John Champa, K8OCL, and co-piloted by Junior DeCastro, PY2BJO. Our cockpit crew did a wonderful job; it's just the other 14 million drivers on those same streets at what seems to be the very same time that made it an experience to remember.

The bad news is that upon arrival at KL7GRF's QTH, it was dark. The antenna array was illuminated only by the ambient light of Los Angeles, and while the eye could see the fine installation of antennas, the camera didn't do so well. The good news is that John invited us back Sunday afternoon before the return to Arizona to re-shoot those antennas in the late afternoon while there was still some daylight left. Those photos will appear in an upcoming issue.

As expected, the shack inside was well done. Neat and organized would be the best description with everything one needs to work DX on the birds. Everything. We'll hold those pictures to go with the antenna shots in a later issue.

Moving on from John's QTH, the group of probably 40 or 50 went to dinner at a nearby Chinese restaurant where good food and great conversation were had by all. The OSCAR 13 DXers presented the Atlas, shown in the photo to the right, to John for his tireless efforts at making and keeping OSCAR DXing fun.



It is difficult to take a picture of the Phase 3D mock-up on display at the Symposium. It's too big for the camera frame. Here, however, we get an idea of its size in relation to a 2-meter M^2 antenna on a stand directly beside the P3D mock-up. Matt Staal discusses a fine point of the antenna while the listener almost "sits" on the main frame of the satellite. One solar panel cuts in front of the listener, the other extends out toward the far back wall. Compared to a 9-inch square Microsat, this satellite is big! (Photo by W1XT)

Sitting across the table from this writer was Alan Penney, VE6LQ, and his XYL Beth. Natives of VK-land, they came to Canada during the early 1970s as a result of Alan's employment. In the photo on the next page, Alan shows off proudly his 150th DXCC country on OSCAR 13, 9L/KD6KQ. Some of our readers may remember the article written for *Satellite Operator* Number 14 for November, 1991 (yes, that's the most recent issue mailed) entitled "A Canadian Approach to Antennas, Their Installation, Cable Use with Duplexers, and Satellite Tracking." We recommend Alan's article for anyone wanting to know more about the hardware that is used for this Canadian's DXing the OSCARs.

M^2 and the Antenna Order Backlog

A display of M^2 antennas was presented in one of the conference rooms of the Holiday Inn Hotel. One could touch and feel the Eggbeater and

OSCAR 10 & 13 TRANSPONDER SCHEDULES

November 14, 1991

OSCAR 13 spacecraft attitude is BLON 181 and BLAT 0 with the following schedule planned until 12 Dec 91 (unchanged from the last issue of *OSR*):

Mode B:	MA 000 to MA 095	
Mode JL:	MA 095 to MA 125	
Mode LS:	MA 125 to MA 130	
Mode S:	MA 130 to MA 140	Please do not uplink on Mode B!
Mode B:	MA 140 to MA 256	
Omnis:	MA 230 to MA 030	

Up to date details of operations from the OSCAR 13 controllers, are on OSCAR 13's PSK, RTTY and CW bulletins. RTTY is at 15-20 and 45-50 after each hour and CW is at 00-05 and 30-35 after each hour. Frequencies are 145.812 MHz and 435.656 MHz +/- Doppler. *(Thanks James Miller, G3RUH).*

OSCAR 10 is currently available for Mode B operation (Uplink: 435.030 - 435.180 MHz; Downlink: 145.975 - 145.825 MHz). The estimated attitude is BLON 337 and BLAT 11 as of Jul 27, 1991. The steady nature of the OSCAR 10 beacon signal tone on 145.810 MHz indicates that the batteries are receiving sufficient charge and it's safe to use the transponder. The solar illumination should return to greater than 50% at the end of October 91. If you find OSCAR 10's Mode B transponder ON when it is in view of your location, please use it unless you hear either the beacon or transponder signals FMing. *(Thanks Graham Ratcliff, VK3AGR).*

KL7GRF is presented a beautiful Atlas by the OSCAR 13 DX gang.

other M² antennas. Mike Staal and son Matt were present to answer any questions from the on-lookers. According to Mike, the backlog of shipments is being reduced quickly and orders are being processed in reasonable times. (See *OSCAR Satellite Report* Number 228 for a description of the M² Eggbeater antennas.)

About Phase 3D

Phase 3D is presently planned for launch in early 1995, but customary slips in schedules may make it late 1996 or early 1997. The satellite weighs about 1000 pounds and will launch out of French Guiana on a newly designed Ariane launch vehicle. The dimensions of this satellite are huge, as you can see in the photograph to the left. Phase 3D will be the base mechanical support for three other satellites (other missions not related to Amateur Radio) so there is going to be a lot riding on this launch, financial, mechanical, and other folks hardware!

A unique feature of this new satellite calls for a phased antenna array to allow changing the beamwidth of the pattern. In this way, narrower patterns can be used (hence higher gains) for when the satellite is at great distances from Earth while wider patterns serve better when the satellite is lower in the orbit.

Phase 3D will require a double engine burn to obtain the projected 60 degree inclination. It may take as long as two years to achieve this final position.

To achieve the various modes of operation, a switching matrix will be incorporated to allow selection of individual transmitters to work with different receivers. One observer even suggested we could see 10 meters up and 10 GHz down! That was in jest, of course, but points to the possibilities of using a matrix design with multiple numbers of transmitters and receivers.

There is some consideration of using the GPS satellite system to achieve attitude control and to point antennas. Additionally, engineering studies are being undertaken to determine the suitability of incorporating Doppler shift compensation for the higher frequency modes of operation.

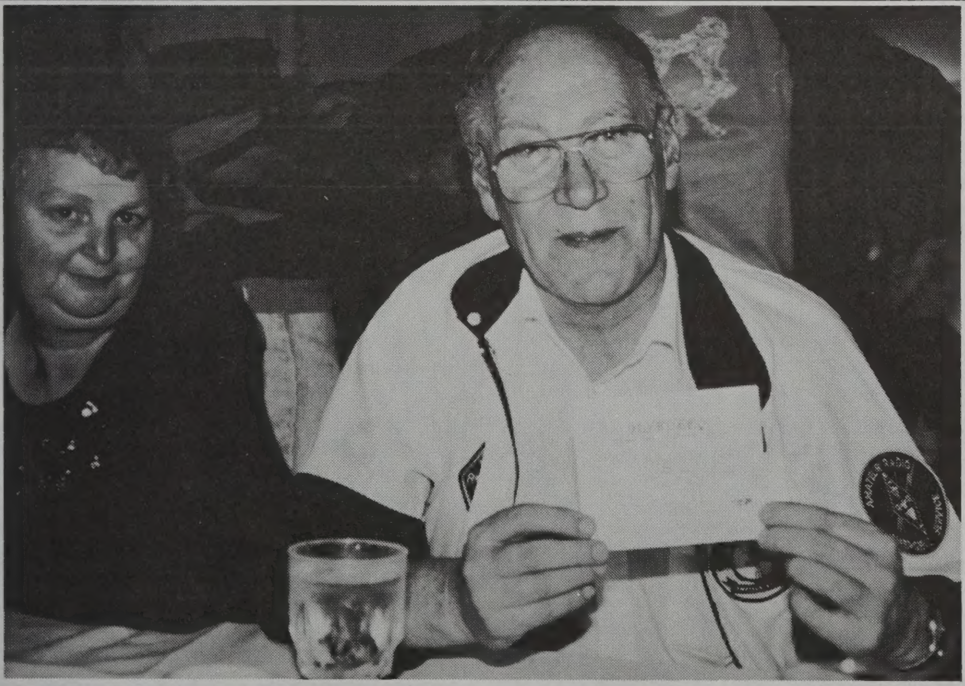
Funding for the project will be a major focus of effort by KO5I over the next several years.

This project will be the largest international cooperative venture ever. Participants at present are known to be from Germany, Finland, Austria, United Kingdom, United States, South Africa, Hungary, Yugoslavia, Italy, Japan, and Australia. The next meeting is scheduled for May 1992 where many members of the engineering team will have further studies on which to report.

SARA and OSCAR Status

It remains unclear as to the OSCAR status of SARA, the French Amateur Astronomy satellite. The AMSAT Board of Directors continues to evaluate the situation and is developing criteria for determining just what constitutes an OSCAR. More on this will come later.

We knew we were at the right Holiday Inn when we saw this plate on a car at the front door! (Photo by W1XT)



Beth and Alan Penny, VE6LQ, attended the Space Symposium and spend a good deal of time manning the registration table for "check-ins." See the text on the previous page for the story behind the QSL card. (Photo by W1XT)

Dr. Junior DeCastro's DOVE Satellite

Bob McGwier, N4HY, presented a paper on the status of DOVE, and the events leading up to the present condition. The "Voice of DOVE" software is almost complete, but while personal work commitments have kept him traveling for nearly eight weeks, he'll be back at the shack in New Jersey ready to complete the work and upload of the data after the Los Angeles meeting. Look for DOVE to become operational again in the next few weeks.

A Microsat from Mexico

I had the privilege of talking at length with David Liberman, XE1TU, about his Microsat project. Dave has promised to send us some photographs along with a story about the entire program very soon. Meanwhile, here are the details as we understand them.

The launch is not too far away: June of 1992. To be named UNAMSAT-1 for *Universidad Nacional Autonoma De Mexico,* this satellite will have two transmitters on board. One is to be a PACSAT system similar to other PACSATs now in orbit. The other transmitter will serve as a PACSAT and double as a scientific experiment. These two transmitters will be about 50 kHz apart in the two-meter band with other work being done in the 40 MHz band.

The scientific experiment is related to measuring the speed and direction of travel of meteors, and to test some theories about transmitting via meteor scatter. Although over the past 10 years or so, meteor scatter activity has probably diminished somewhat, some long (relatively speaking) transmissions have been made using this mode of communications and XE1TU is sure his experiments will rekindle some activity for the mode.

The project is now about 70% complete and involves 11 people, 6 of whom are students. The Microsat will launch aboard an Ariane vehicle with two other satellites from Mexico designed for telecommunications.

The receiver portion of UNAMSAT-1 will be quite similar to those designed by Tom Clark, W3IWI, that are presently supporting most of the PACSAT satellite activity from space.

About software, David says they are currently working on it and he expects all the software to be completely operational ahead of launch.

At the University of Mexico, David and his team have built two command stations. One is for the PACSAT operations and one is for the scientific experiments. The control stations are in separate locations and will be able to serve the needs and functions of the other.

SAREX and the Next Flight

Reports have been given in *OSCAR Satellite Report* over the past few months about SAREX operation aboard STS-45. Lou McFadin, W5DID, SAREX expert for NASA at JSC told us that STS-45 should launch about March 10, 1992 (just a few months from now!) and will carry the old familiar Motorola HT used in earlier flights. STS-45, however will only have voice capability. Space and power restraints aboard the orbiter have kept the SAREX equipment down to a minimum and the HT will run on its own batteries. If the batteries are charged at the last possible moment, current estimates are that they will have about 3 hours of operation per day *available* during the flight. Actual on the air time will depend on astronaut time available and the flight schedule. Some school schedules will be set up as in past missions. Frequencies will be announced soon and are expected to be similar to earlier flights.

The following SAREX Mission, STS-50, now in the final stages of readiness, is hoped to have video fast and slow scan operations but problems with storage of equipment persists. A June, 1992 flight is expected so there's not much time for further preparation on that one.

Jay Apt will fly aboard STS-52 or 53 in August or September but any SAREX mission is unknown at the moment. And following that, several years out, Ron Parise, WA4SIR, will make another flight, but, that is too far out to speculate on SAREX operation details.

And the Beat Goes On

Since we are space limited in any single edition of our publications, we have only begun to report on the activities of this Symposium. More will follow in upcoming issues of both *OSCAR Satellite Report* and *Satellite Operator*. We invite you to take an active part in the Amateur Radio Satellite Program as we head on into 1992. Each year gets more exciting "as the beat goes on." ◆◆◆

SATELLITE ORBITAL ELEMENTS

(November 14, 1991)

Satellite: AO-10
Catalog number: 14129
Epoch time: 91307.09985695
Element set: 0708
Inclination: 025.7973 deg
RA of node: 116.5596 deg
Eccentricity: 0.6075212
Arg of perigee: 289.8430 deg
Mean anomaly: 016.7190 deg
Mean motion: 02.05888636 rev/day
Decay rate: 4.35e-06 rev/day^2
Epoch rev: 03511

Satellite: RS-10/11
Catalog number: 18129
Epoch time: 91314.91225783
Element set: 928
Inclination: 82.9250 deg
RA of node: 310.4302 deg
Eccentricity: 0.0012758
Arg of perigee: 133.1543 deg
Mean anomaly: 227.0694 deg
Mean motion: 13.72229859 rev/day
Decay rate: 1.75e-06 rev/day^2
Epoch rev: 21971

Satellite: UO-11
Catalog number: 14781
Epoch time: 91314.56733190
Element set: 126
Inclination: 97.8796 deg
RA of node: 353.9670 deg
Eccentricity: 0.0013467
Arg of perigee: 61.7760 deg
Mean anomaly: 298.4924 deg
Mean motion: 14.67693320 rev/day
Decay rate: 3.421e-05 rev/day^2
Epoch rev: 41091

Satellite: RS-12/13
Catalog number: 21089
Epoch time: 91313.12650755
Element set: 176
Inclination: 82.9236 deg
RA of node: 356.6579 deg
Eccentricity: 0.0027791
Arg of perigee: 235.6589 deg
Mean anomaly: 124.1938 deg
Mean motion: 13.73940761 rev/day
Decay rate: 1.62e-06 rev/day^2
Epoch rev: 3804

Satellite: AO-13
Catalog number: 19216
Epoch time: 91310.60757627
Element set: 0287
Inclination: 056.7146 deg
RA of node: 062.2382 deg
Eccentricity: 0.7235702
Arg of perigee: 269.3641 deg
Mean anomaly: 015.2670 deg
Mean motion: 02.09704227 rev/day
Decay rate: 7.00e-08 rev/day^2
Epoch rev: 02604

Satellite: UO-14
Catalog number: 20437
Epoch time: 91313.20776370
Element set: 476
Inclination: 98.6610 deg
RA of node: 31.7694 deg
Eccentricity: 0.0011502
Arg of perigee: 98.7680 deg
Mean anomaly: 261.4795 deg
Mean motion: 14.29352727 rev/day
Decay rate: 9.80e-06 rev/day^2
Epoch rev: 9370

Satellite: AO-16
Catalog number: 20439
Epoch time: 91303.43482414
Element set: 320
Inclination: 98.6645 deg
RA of node: 22.4773 deg
Eccentricity: 0.0011664
Arg of perigee: 125.6497 deg
Mean anomaly: 234.5830 deg
Mean motion: 14.29403387 rev/day
Decay rate: 7.74e-06 rev/day^2
Epoch rev: 9231

Satellite: DO-17
Catalog number: 20440
Epoch time: 91307.74593498
Element set: 0323
Inclination: 098.6600 deg
RA of node: 026.8293 deg
Eccentricity: 0.0011663
Arg of perigee: 116.7080 deg
Mean anomaly: 243.5841 deg
Mean motion: 14.29521455 rev/day
Decay rate: 1.239e-05 rev/day^2
Epoch rev: 09293

Satellite: WO-18
Catalog number: 20441
Epoch time: 91304.98295464
Element set: 316
Inclination: 98.6636 deg
RA of node: 24.1375 deg
Eccentricity: 0.0013176
Arg of perigee: 122.8434 deg
Mean anomaly: 237.4089 deg
Mean motion: 14.29532630 rev/day
Decay rate: 7.82e-06 rev/day^2
Epoch rev: 9254

Satellite: LO-19
Catalog number: 20442
Epoch time: 91305.43986181
Element set: 318
Inclination: 98.6643 deg
RA of node: 24.6714 deg
Eccentricity: 0.0012597
Arg of perigee: 120.4568 deg
Mean anomaly: 239.7972 deg
Mean motion: 14.29613132 rev/day
Decay rate: 8.11e-06 rev/day^2
Epoch rev: 9261

Satellite: FO-20
Catalog number: 20480
Epoch time: 91312.85519035
Element set: 326
Inclination: 99.0464 deg
RA of node: 267.6871 deg
Eccentricity: 0.0541287
Arg of perigee: 333.9342 deg
Mean anomaly: 23.5395 deg
Mean motion: 12.83238578 rev/day
Decay rate: 1.86e-06 rev/day^2
Epoch rev: 8211

Satellite: AO-21
Catalog number: 21087
Epoch time: 91311.95334980
Element set: 176
Inclination: 82.9436 deg
RA of node: 127.3792 deg
Eccentricity: 0.0033929
Arg of perigee: 217.9954 deg
Mean anomaly: 141.8815 deg
Mean motion: 13.74426239 rev/day
Decay rate: 1.73e-06 rev/day^2
Epoch rev: 3877

Satellite: UO-22
Catalog number: 21575
Epoch time: 91307.73916569
Element set: 0029
Inclination: 098.5298 deg
RA of node: 020.5310 deg
Eccentricity: 0.0007566
Arg of perigee: 261.2275 deg
Mean anomaly: 098.8609 deg
Mean motion: 14.36278531 rev/day
Decay rate: 9.16e-06 rev/day^2
Epoch rev: 01574

Satellite: MIR
Catalog number: 16609
Epoch time: 91298.24136517
Element set: 803
Inclination: 51.6048 deg
RA of node: 354.4905 deg
Eccentricity: 0.0004576
Arg of perigee: 15.2817 deg
Mean anomaly: 344.8311 deg
Mean motion: 15.56674518 rev/day
Decay rate: 3.8808e-04 rev/day^2
Epoch rev: 32544

Satellite: SARA
Catalog number: 21578
Epoch time: 91290.20667098
Element set: 55
Inclination: 98.5311 deg
RA of node: 3.1247 deg
Eccentricity: 0.0004848
Arg of perigee: 328.2371 deg
Mean anomaly: 31.8519 deg
Mean motion: 14.36098198 rev/day
Decay rate: 3.651e-05 rev/day^2
Epoch rev: 1322

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